



SPRINTT PHYSICAL EXERCISE BOOKLET



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PHYSICAL ACTIVITY PREDICTS HEALTHY AGING

The practice of physical activities throughout the life course is one of the main ingredients for a healthy life during old age. If on one hand, ageing predisposes to the development of sarcopenia and physical frailty, two harmful conditions that reduce muscle strength and physical function; on the other hand, being physically active might prevent the genesis of both conditions and promote a healthier life. Don't you worry if you are not currently exercising. It is never too late to start being active!

Sarcopenia is a condition characterized by low muscle strength, reduced muscle mass and physical dysfunction, leading to the loss of the ability to take care of ourselves. Inadequate levels of physical activity have a key role in the development of sarcopenia.

Physical frailty is a syndrome highly prevalent in older adults. A frail person might have difficulties with walk, muscle weakness, excessive fatigue, and unwanted weight loss. The lack of physical activity and malnutrition are major factors leading to frailty.

Sarcopenia and physical frailty often lead to difficulties in performing activities of daily life and increase the risk of falls. Regular physical activity and adequate nutrition can help older adults remain engaged in social life and promote quality of life. Combining different types of exercise is considered to be the most effective strategy to improve health and avoid the undesirable consequences of sarcopenia and physical frailty.

Do you present any of the following characteristics indicative of sarcopenia and physical frailty?

- Underweight or overweight
- Need to use a cane to get around
- Slow or insecure walking
- Need support to rise from a chair
- Need to use handrails when walking up or down stairs

If so, regular physical activity and good nutrition can help you prevent the progression of sarcopenia and frailty and their negative effects on health.

The aim of this SPRINTT physical activity booklet is to provide information about:

- The benefits of physical activity
- How to start physical exercise
- How to perform a home-based physical activity program

SPRINTT (Sarcopenia and Physical Frailty IN older people: multi-Component Treatment strategies) is a randomized controlled trial (RCT) studying the efficacy of a multicomponent intervention in the prevention of mobility disability in older adults with physical frailty and sarcopenia. The SPRINTT trial was conducted in 11 European countries, under the coordination of the Department of Geriatrics at the Università Cattolica del Sacro Cuore (Rome, Italy).

HOW TO START EXERCISING?

Regular physical activity is one of the best things that you can do for your health. However, there are some things to be considered before starting an exercise routine.

The first thing to do is contacting a doctor and getting a health check-up. This is particularly important for older individuals and for those who are not accustomed to intense physical activities. A medical examination can help design an exercise program focused on individual needs. For example, pain in knee or hip joint is not a contraindication to exercise. However, exercises should be adapted for comfort and safety.

A consultation with a nutritionist might be necessary, especially if you have experienced weight loss or poor appetite. Sufficient energy and protein intake is needed to increase muscle mass and strength. It is also important to drink water when exercising even though you may not feel thirsty.

A physical therapist or an exercise instructor, specialized in physical activity for older people, can help create an individualized exercise plan that includes attainable goals. Having physical activity into your routine in the long term requires discipline.

It is good to remember that every step counts and it's never too late to start!

Doing some physical activity is better than doing nothing. Physical activity recommendations for older adults include suggestions for many physical parameters.

Table 1. Physical activity recommendations for older adults (modified from Physical Activity Guidelines for Americans 2018)

Active daily life	Some physical activity is better than none. Try to be as much active in daily life as possible, avoiding sedentary lifestyle.
Aerobic training, e.g. walking	At least 30 minutes of moderate aerobic training five days a week (150 minutes a week) or 15 minutes of vigorous-intensity aerobic activity (75 minutes a week). An equivalent combination of both intensities may be also effective. It is also possible to divide the exercise session in shorter periods of time along the day, e.g. 3 sets of 10 minutes or 6 sets of 5 minutes.
Muscle strength	Muscle strengthening exercises that involve major muscle groups at least 2 days a week.
Balance	Balance exercises at least three times a week, including functional training.
Stretching	Stretching exercises that maintain the flexibility necessary for activities of daily life.

HOME-BASED PHYSICAL ACTIVITY PROGRAM

In the present booklet, we propose a safe and effective home-based physical activity program for reducing the risk of loss in mobility. This program was designed based on the SPRINTT and LIFE studies.

The home-based exercise program includes many types of exercises with a key role in the maintaining of your mobility, including walking, balance, strength, and stretching exercises. Exercises should begin at low intensity and gradually increase after 2-3 weeks of regular training, if you feel able. The following instructions provide options to start and progress your exercise program.

AEROBIC TRAINING

An easy way to start aerobic training is walking. It conveys a lot of health benefits and can be performed almost everywhere. An alternative to walking, if knee pain occurs, is stationary cycling.

The weekly 150 minutes of moderate intensity aerobic training can be achieved by walking 30 minutes five days a week. Walking short periods of time along the day may be an alternative for people who cannot keep walking for longer.

An example may be walking 10 minutes from your home to the mall, shopping for 10-15 minutes, and then going back home. This approach can be useful also in the winter when walking outdoors may be uncomfortable.

To walk at moderate intensity, you should be able to talk while you are walking. As you feel comfortable, higher intensities may be reached by walking faster. As intensity increases, it will be harder to walk and talk at the same time. Do not forget to walk at the pace your condition allows.

Intensity	"Talk test"
Light	Able to talk or sing
Moderate	Able to talk but not sing
Vigorous/ hard	Difficult to talk

Table 2. Rating of perceived exertion (modified from Phillips & Kennedy 2012)

BALANCE EXERCISES

A good balance favors more stable walking on different surfaces and reduces the risk of falls. A good strategy to improve this key physical capability is performing exercises in which you should challenge your postural control. Hence, balance training should be performed carefully and if possible, in the presence of someone else. A support bar, a chair, a table or even a wall may be alternatives to practice the exercises alone.

1. Hip rotation

Benefits:

Improves balance and postural control.

Starting position:

1. Stand with feet forward slightly greater than shoulder-width apart.
2. Hands on the hips.
3. Look forward.

The movement:

1. Tighten your abdominal muscles.
2. Make a complete circle with hips to the right side and then to the left side.
3. Do not move shoulders or feet.

Repetitions: 5 times for each side.

Less challenging: Use a chair as a support for both hands.

More challenging: Do wider movements and more repetitions.



2. Steps forward shifting weight

Benefits:

Improves balance and walking control. Shifting weight over to the other leg in different directions is needed to keep up balance on slippery and unstable surfaces (e.g. in a bus).

Starting position: Stand parallel to the wide edge of the kitchen table.

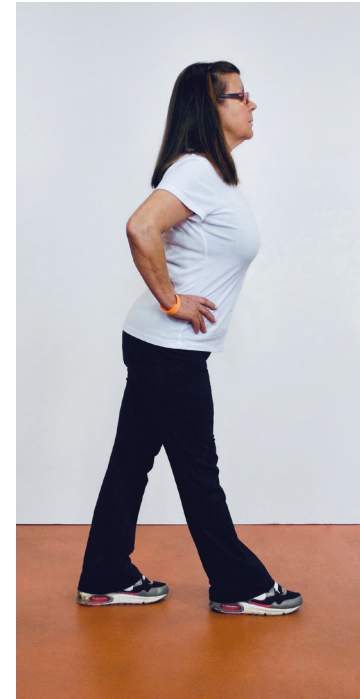
The movement:

1. Hold the edge of the kitchen table.
2. Step forward with your right leg shifting your weight forward over the right leg.
3. Return the leg to the starting position.
4. Repeat the movement with the left leg.

Repetitions: 10 times for each side.

Less challenging: Do less repetitions.

More challenging: Keep hands on your hip.



3. Steps backward shifting weight

Benefits:

Improves balance and walking control.

Starting position: Standing parallel to the wide edge of the kitchen table.

The movement:

1. Hold the edge of the kitchen table;
2. Step backward with your right leg shifting your weight over the right leg.;
3. Return the leg to the starting position;
4. Repeat the movement with the other leg.

Repetitions: 10 times for each side.

Less challenging: Do less repetitions.

More challenging: Keep hands on your hip.



4. Side steps

Benefits:

Improves the control of body movement.

Starting position: Stand facing the kitchen sink and hold on with both hands.

The movement:

1. Move laterally your hands to the right side along the kitchen sink;
2. Move laterally your right leg to the right side;
3. Be sure that your right arm and leg are aligned;
4. Move laterally your left arm and leg to the right side;
5. Return to the starting position.

Repetitions: 10 times for each side.

Less challenging: Do less repetitions.

More challenging: Keep arms on your hips.



5. Leg cross

Benefits:

Improves the control of body movement. Stepping cross over the other leg is needed to keep up balance on slippery and unstable surfaces.

Starting position: Stand facing the kitchen sink and hold on with both hands.

The movement:

1. Cross left foot behind the right foot;
2. Move laterally right hand and leg to the right side;
3. Return to the initial position.

Repetitions: 10 times for each side.

Less challenging: Do less repetitions.

More challenging: Keep hands on your hips.



6. Tandem walking

Benefits: Improves balance and the control of body movement.

Starting position: Stand with your left side a foot away from the wall.



The movement:

1. Move your left hand ahead along the wall;
2. Put your right heel immediately in front of the toes of your left foot.
3. Put your left heel immediately in front of the toes of your right foot.

Repetitions: 10 times to each direction;

Less challenging: Do less repetitions.

More challenging: Keep arms on the hips.

7. One-leg stand

Benefits:

Improves balance and the control of body movement. This movement is important when stepping into a bus, for example

Starting position: Stand and hold on with both hands on a chair.

The movement:

1. Flex your right knee, so that your heel goes towards your buttocks;
2. Hold your leg flexed for 5 seconds;
3. Return to the initial position;

Repetitions: 10 repetitions of 5 seconds for each side.

Less challenging: Lift your leg slight from the floor.

More challenging: Keep holding your knee flexed for more time.



STRENGTH EXERCISES

A man with grey hair, wearing a white t-shirt and white shorts, is sitting on a metal chair in a gym. He is leaning back against a wooden wall with horizontal bars. His legs are extended forward, and he is wearing blue and orange sneakers. The background is a light-colored wall with a wooden ladder-like structure.

The following strength exercises focus primarily on improving muscle strength of the lower limbs. This is important for maintaining functional capacity and ability to walk. We also included exercises for upper limb muscle groups that have a key role in the performance of many activities of daily living. A peculiarity of strength training is that muscles must work harder than they commonly do in daily activities to improve strength. Exercises should be performed slowly taking care of correct postures.

The exercises can be performed with the help of a friend, a chair, a table, or a wall. It would be great if the backrest of the chair had the height of your navel, but it is not absolutely needed. Use ankle weights to make exercises more challenging. Move slowly during the exercises and do not forget to breathe during the repetitions.

1. Leg squat

Benefits:

The main benefit of leg squat exercise is improving lower limb muscle strength. This is the main exercise of this program due to its positive effects on lower limb muscle strength. We recommend that you try to perform at least this exercise, if you cannot perform any of the others. It can be easily combined with activities of daily living.

Starting position: Seated, looking ahead, with feet slightly wider than shoulder-width apart and arms crossed in front of the chest.

The movement:

1. Get up from the chair with arms crossed in front of the chest;
2. Focus on your leg and buttocks muscles. They are doing most of the work in this exercise;
3. Sit on the chair shifting your weight to your buttocks;
4. Be ready for the next repetition.



Repetitions: Do 10 repetitions, rest for 1-2 minutes, and make more 10 repetitions.

Less challenging: Use a support to get up from the chair.

More challenging: Try to not touch your buttocks on the chair while you are seating and then get up fast.

2. Knee extension

Benefits:

Improves muscle strength in thighs.

Starting position: Seated looking ahead with feet slightly wider than shoulder-width apart and arms along the legs or holding the chair. A rolled towel can be placed beneath the knees for comfort and to allow full range of motion during the exercise.

The movement:

1. Slowly raise the right leg until it is fully extended, with the knee as straight as possible;
2. Remain with knee extended for 1-2 seconds, while taking a breath;
3. Slowly lower the right leg back to the ground.

Repetitions: Do 10 repetitions for each side, rest for 1-2 minutes, and then repeat the whole set.

1. Less challenging: Do less repetitions.

More challenging: Use ankle weights to increase the intensity.



3. Hip flexion

Benefits:

Improves lower limb muscle strength.

Starting position: Standing parallel to a chair.

The movement:

1. Hold on the chair;
2. Shift your body weight to the left leg;
3. Slowly lift the right knee up;
4. Remain in this position for 1-2 seconds;
5. Slowly lower the leg down.

Repetitions: Do 10 repetitions for each side, rest for 1-2 minutes, and then repeat the whole set again.

6. Less challenging: Do less repetitions.

More challenging: Use ankle weights to increase the intensity.



4. Toe stand

Benefits:

Improves muscle strength of calf muscles.

Starting position: Stand straight behind a chair with feet shoulder-width apart and hands hold on the backrest of the chair.

The movement:

1. Raise your heels as high as possible;
2. Remain in this position for 1-2 seconds;
3. Slowly return to the initial position.

Repetitions: Do 10 repetitions, rest for 1-2 minutes, and then repeat the whole set again.

Less challenging: Do less repetitions.

More challenging: Use ankle weights to increase the intensity.



5. Hip extension

Benefits:

Improves buttocks and hips muscle strength.

Starting position: Stand behind a chair with feet slightly apart and hold on the backrest of the chair.

The movement:

1. Shift your body weight to the left leg;
2. Lift right leg straight back without bending the knee;
3. Do not lean forward;
4. Remain in this position for 1-2 seconds;
5. Slowly return to the initial position.

Repetitions: Do 10 repetitions for each side, rest for 1-2 minutes, and then repeat the whole set again.

Less challenging: Do less repetitions.

More challenging: Use ankle weights to increase the intensity.



6. Side hip raise

Benefits:

Improves muscle strength of buttocks and hips.

Starting position: Standing parallel to a chair.

The movement:

1. Shift your body weight to the right leg;
2. Lift the left leg out to the side, just that high that you make sure not to bend your hip or lean to the side;
3. Remain in this position for 1-2 seconds;
4. Slowly return to the initial position.

Repetitions: Do 10 repetitions for each side, rest for 1-2 minutes, and then repeat the whole set again.

Less challenging: Do less repetitions.

More challenging: Use ankle weights to increase the intensity.



7. Wall push-up

Benefits:

Improves upper limb muscle strength.

Starting position: Stand facing the wall approximately two feet away keeping your feet shoulder-width apart. Tighten your abdominal muscles and focus on a straight body line. Lean forward and place hands on the wall slightly wider than shoulder-width apart.

The movement:

1. Flex your elbows down until approaching the wall;
2. Remain in this position for 1-2 seconds;
3. Return to the initial position.

Repetitions: Do 10 repetitions for each side, rest for 1-2 minutes, and then repeat the whole set again.

Less challenging: Do less repetitions.

More challenging: Do more repetitions.



8. Lawn mower pull

Benefits:

Improves muscle strength of shoulders and upper back.

Starting position: Stand with feet shoulder-width apart with hand crossed over to the opposite hip with palm faced inward.

The movement:

Lift arm up across the body. Hold for a second. Then bring slowly the arm back across the body with palm facing inward.

Repetitions:

Do 10 repetitions for each side, rest for 1-2 minutes, and then repeat the whole set again.

Less challenging: Do the exercise in a sitting position or do not lift arm above shoulder level.

More challenging: Do the exercise while holding an ankle weight or a tennis ball or do more repetitions.



9. Tennis ball squeeze

Benefits:

Improves muscle strength of arms and hands.

Starting position: Seated on a chair holding a tennis ball in one hand.

The movement:

Squeeze the tennis ball over 5 seconds;

Repetitions: Do 10 repetitions with each hand, rest for 1-2 minutes, and then repeat the whole set again.

Less challenging: Do less repetitions.

More challenging: Remain squeezing the ball for more time.



STRETCHING EXERCISES

The aim of stretching exercises is to maintain and improve the range of motion of joints and muscle flexibility. Stretching should be performed after the other exercises when muscles are warmed up. Stretching positions should be hold for about 10-20 seconds. You shouldn't feel any pain but muscles could be a bit tight.

1. The stretch for the back of the leg

Benefits:

Sit back on the chair with feet flat on the floor.

The stretch:

Extend the right leg so that your heel is on the ground and toes pointing up. Put your hands on the thighs, bring your chest toward your leg. Feel a stretch in the back of the leg. Keep your back straight. Repeat with the other leg.

Note:

Breathe regularly.



2. Upper-back mobilization

Starting position: Stand with feet shoulder-width apart and knees straight but not locked or do the exercise in a sitting position.

The move:

Keep hands together and press palms away from the body, and feel a stretch in your upper back and shoulders. Then, extend both arms behind you, and straighten your upper body. Feel the stretch on your chest.

Repetitions:

Repeat 5 times in a flowing movement.





EXERCISE DIARY

An example of a weekly physical activity program can be found in the table below.

DAY	WALKING (or other aerobic activities)	BALANCE	STRENGTH	STRETCHING
Monday	20 min			Exercises 1-2
Tuesday	30 min	Exercises 1-7		
Wednesday	10 min	Exercises 1-3	Exercises 1-9	Exercises 1-2
Thursday	30 min	Exercises 1-7		
Friday	20 min	Exercises 1-3	Exercises 1-9	Exercises 1-2
Saturday	10 min			
Sunday	30 min	Exercises 1-3		

You can write your walking time and exercises on this exercise diary:

DAY	WALKING (or other aerobic activities)	BALANCE	STRENGTH	STRETCHING
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

FEEDBACK FROM THE SPRINTT PARTICIPANTS



Kaarina, 88 years (Finland)

"I didn't like exercising at all before I attended the SPRINTT intervention. I felt tired and lazy, and I also had some mobility difficulties, for example I couldn't even climb up one floor of stairs. Now that I have participated to the SPRINTT intervention group for three years, I feel like I am 10 years younger! My legs feel stronger and I can climb up the stairs to the fourth floor. I have experienced that the home-based exercises are an important part of daily routines."



Alicia, 88 years (Spain)

"When I was contacted by the SPRINTT team and they explained to me what the study was about, I didn't hesitate and I agreed immediately. Since then, there have been 3 wonderful years and I can say that I feel much more agile, I have left my walking sticks at home in most of my movements and I have met new friends, something I didn't expect at my age. I have realized the importance of being active and going outside every day. Thanks to all the staff members of the SPRINTT study."



Franz, 75 years (Germany)

"I wasn't physically active for my whole life, even in school the physical education was horrible for me. My primary physician told me one day that I really had to change something and that I should start being more active. I decided to take part in the SPRINTT study. At the beginning, I was skeptical. The exercises were simple but very effective. Now, the program is an inherent part of my life because I really profit by the exercises and also my primary physician told me, that this was the best I could do for myself."



Dionisia, 73 years (Parma, Italy)

"Doing physical activity in a group, followed with so much passion and enthusiasm by the multidisciplinary team, changed my life. I discovered that I could still improve my physical performance and not passively accept the natural decline of age. The strength of the group is important to improve and continuously attend the exercise sessions"



Kristin, 93 years (Iceland)

"During the SPRINTT program our trainer took us to many wonderful places to walk and made us enjoy walking. I appreciate very much the exercise group and the teachers."



Marie Thérèse, 73 years (France)

"I am very satisfied to be a part of the SPRINTT experience. I had the chance to move, and to learn simple exercises suitable for a not sporty person like me. I continue exercising and walking a little on my own when the weather allows me to".

